

therefore I sent my paper on *Amœba princeps* to the press with the few allusions which it contains to what Dr. Wallich had previously published on *A. villosa*.

As to this paper conveying the impression that "every one of the characters peculiar to the *Amœba* of which Dr. Wallich wrote had been or were "for the first time" brought to notice by myself (p. 115, vol. xii.), that I have not been "just" to Dr. Wallich (*ibid.*), and that I have "assailed directly or indirectly nearly every opinion and statement" that he has made in the communications under reference (p. 151), I certainly do not think that my paper calls for any such expressions, and, without defending myself in long explanatory notes which no one would read, am quite content to receive the verdict which those acquainted with the subject may be disposed to give after reading Dr. Wallich's and my own papers respectively in the 'Annals' for 1863, Nos. 64 to 68 inclusive.

Dr. Wallich (p. 115) has completely distorted the application of the term "nomenclature" as I have used it in the commencement of my paper (p. 30). The passage runs thus:—"It may be remembered by those who have read my 'Notes on the Organization of Infusoria, &c.' [published in 1863], that I have therein proceeded upon a certain nomenclature of *their parts* generally; and I shall pursue the same course here in the description of *A. princeps* specially." Yet, to read Dr. Wallich's objections, it would appear that I had used the word "nomenclature" with reference to *species*. It was not until 1863 that I ever met with *A. princeps* in such numbers as to be able to make so much out of it as I have done of the other freshwater Rhizopods, viz. as regards its "reproductive cells." And as in this paper the *Amœba* are not referred to generally, my remarks must be considered to apply to *A. princeps* specially, where it is not stated otherwise.

Of Dr. Wallich's criticisms on my "Communications" on the Infusoria generally previous to 1863, I must also leave the public to judge; and if I ever carry out my intention of writing more at length on the subject, I shall then, in the general review of what I have written since 1856 inclusive, hope to benefit by what my friend Dr. Wallich has written in 1863.

XXI.—*On the Nomenclature of the Foraminifera.*

By W. K. PARKER, Esq., and Prof. T. R. JONES, F.G.S.

Part IX.—*The Species enumerated by De Blainville and De France.*

DE BLAINVILLE, in the article "Mollusques" (*Dictionnaire des Sciences Naturelles*, xxxii. 1824), enumerates several forms

of Foraminifera under various names, obtained from Fichtel and Moll, Lamarck, Montfort*, and DeFrance; but the nomenclature adopted requires revision, and the classification is necessarily erroneous, since these microzoa were at that time still grouped among the Cephalopods, and no clue had been obtained to the right understanding of their zoological relations. DeFrance at the same time revised the several genera and species, especially those of which he had obtained specimens in the fossil state, and added accounts of some previously unrecognized forms.

Besides the Foraminifera thus treated of, there are several others which De Blainville and DeFrance arranged as "Poly-piers" (*Dactylopora*, *Fabularia*, *Larvaria*, *Lycophris*, *Orbitolites*, *Oryzaria*, *Ovulites*, *Polytrema*, and *Polytrypa*).

In his 'Malacologie' † and 'Actinologie' ‡, based on articles in the 'Dict. Sc. Nat.,' De Blainville also treats of these forms.

The publication of the 'Dict. des Sc. Nat.' (60 vols. 8vo, Paris and Strasbourg) extended from 1816 to 1830, during which time Alcide Dessalines D'Orbigny also was busy with the study of Foraminifera, and a systematic catalogue (in the "Tableau méthodique de la Classe des Céphalopodes") was published by him in the 'Annales des Sciences Naturelles,' vii. 1825-26. DeFrance and Blainville, in the later volumes of the 'Dict. Sc. Nat.,' refer to D'Orbigny's work; whilst, in the latter, references are made to the early volumes of the 'Dict. Sc. Nat.'

De Blainville seems to have added very little to the knowledge of Foraminifera, having chiefly laboured in their systematization on false grounds. DeFrance, by careful observation, added a few new forms, chiefly fossil, to those already known, and appears to have had a clearer perception of the relationships of certain of the Foraminifera than some of his contemporaries had.

1. Alvéolite. 1816. Dict. i. p. 557. Under this head G. L. Duvernoy here confounds Lamarck's genus of corals (*Alveolites*) and Bosc's "Alvéolite grain de fétuque" and "Al. grain de millet," the first of which is an *Alveolina*. In the Supplement to the same volume (art. "Alvéolites," p. 136) DeFrance refers to these little fossil forms (see Ann. Nat. Hist. ser. 3. viii. p. 162); and

* Notes on the generic and specific names derived from the works of Linnæus, Fichtel and Moll, Lamarck, and De Montfort, have already been published, in our papers on the Nomenclature of the Foraminifera, in the 'Annals of Natural History,' 1859 & 1860.

† Manuel de Malacologie et de Conchyliologie, par H. M. De Blainville, 2 vols. (text and plates), 8vo, Paris, 1825.

‡ Manuel d'Actinologie ou de Zoophytologie, par H. M. De Blainville, 2 vols. (text and plates), 8vo, Paris, 1834.

subsequently in 1820 (Dict. Sc. Nat. xvi. p. 103) he again treats of them, referring one to *Oryzaria Boscii* and the other to *Fabularia Discolithus* (*loc. cit.*). *Alveolina Boscii*, DeFr., is illustrated by D'Orbigny's 'Modèle,' No. 50, and *Fabularia Discolithes* by Modèle No. 100. DeFrance also alludes (Dict. i. p. 137) to another form of *Alveolina* under the provisional name of *Alveolites Larva*, fossil, from Valognes, smooth, pointed at the ends, and sometimes 8 lines in length.

2. *Chrysaora damæcornis*, Lamouroux. The specimen figured in the Atlas, Zooph. pl. 42. f. 2, and Blainv. Actinol. pl. 64. f. 2, is not described in the Dict. Sc. Nat., but is treated of by Blainville in his 'Actinologie,' 1834, p. 414, pl. 64. f. 2, as a zoophyte, and is probably a *Carpenteria*, which is a peculiar form of Rhizopod, related to the *Globigerinida*; it is tent-like, or like a small Barnacle, and fixed by the base; the frame is calcareous and basket-like, holdly perforate, and containing the sarcode, which appears to be full of spicules. It forms a link between the Foraminifera and the Spongiadae. See Carpenter's 'Introduction to the Study of Foraminifera' (Ray Society), 1862.

3. *Cibicides refulgens*, De Montfort. Dict. ix. p. 188, xix. p. 2, xxxii. p. 187; Atlas, Conch. pl. 19. f. 2; Blainville, Malac. p. 391, pl. 10. f. 2. This is *Truncatulina refulgens*. [Type: *Planorbulina farcta*.] See 'Annals Nat. Hist.' ser. 3. v. p. 177, vi. p. 340, and Carpenter's 'Introduction,' p. 206.

4. *Crepidulina Astaculus*, De Blainville (*Astaculus crepidulatus*, De Montfort). Dict. xix. p. 8, xxxii. p. 188; Atlas, Conch. pl. 19. f. 8; Blainv. Malac. pl. 10. f. 8. This is *Cristellaria Crepidula*. [Subtype: *Crist. Calcar*.] See Ann. Nat. Hist. ser. 3. v. p. 114.

5. *Crepidulina Auricula*, Fichtel and Moll, sp. Dict. xxxii. p. 188; Bl. Malac. p. 383. This is *Pulvinulina Auricula* (var. β), F. & M. sp. [Type: *Pulvinulina repanda*, F. & M.] See Ann. Nat. Hist. ser. 3. v. p. 177, and Carpenter's 'Introduction,' p. 210.

6. *Crepidulina elongata*, De M. sp. Dict. xxxii. p. 188. This is a variety of *Cristellaria Calcar*. See Ann. Nat. Hist. ser. 3. vi. p. 344.

7. *Cristellaria Calcar*, DeFr. Dict. xi. p. 615. DeFrance adopted this name (used also by Linnæus) for the rowel-like forms found on the Italian shores and in the Tertiary deposits of Tuscany, and figured by Soldani; and he defines them as being smaller and more convex than *C. Cassis*, and having the keel produced into projecting points. DeFrance assures naturalists that this *Cristellaria* really occurs in both the recent and the fossil state.

8. *Cristellaria Cassis*, *F. & M.* sp. Dict. xi. p. 614, xxxii. p. 188. See Ann. Nat. Hist. ser. 3. v. p. 115.

9. *Cristellaria lævis*, *Defrance*, 1818. Dict. xi. p. 614. This is a subvariety of *C. Cassis*, having no septal ribs, and a smaller umbonal knob. Defrance does not insist on its being specifically distinct.

10. *Cristellaria producta*, *Lam.* Dict. xi. p. 614. Under this name Lamarck placed two of Fichtel and Moll's varieties (β and γ) of *Cristellaria Cassis*; fossil, from Coroncina, Italy.

11. Dactylopore. Dict. xii. p. 443. *Dactylopora cylindracea*, Lamarck; Atlas, Zooph. pl. 47. f. 4, pl. 51. f. 6; Blainv. Actinol. pl. 72. f. 4, pl. 76. f. 6. Defrance obtained his specimens from the "Calcaire coquillier" of Grignon, near Versailles, and the sand of Pontoise. In the Ann. Nat. Hist. ser. 3. v. pp. 20-27, we described several varieties of *Dactylopora*, recent and fossil: these descriptions have since been revised and illustrated in Dr. Carpenter's 'Introduction,' pp. 127-137, pl. 10. The varieties now adopted are *D. Eruca*, *D. Annulus*, *D. digitata*, *D. clypeina* (*Clypeina marginoporella*, Michelin; *Dactylopora marginoporella*, P. & J. 1860), *D. reticulata* (*Larvaria reticulata*, Defrance), *D. glandulosa* (*Prattia glandulosa*, D'Archiac), and *D. cylindracea*, Lamarck.

The microscopic fossils (from Podolia and Volhynia) figured and described by A. Zborezewski in the 'Nouv. Mém. Soc. Nat. Moscou,' 1834, p. 308, pl. 26. f. 1-3, as *Cellulina Eichwaldii*, *C. Besseri*, and *C. Puschii*, are probably *Dactyloporæ*. Accompanying these, *Polymorphina lactea*, var. *tubulosa*, is figured both as *Raphulina Humboldtii* (p. 311, pl. 28. f. 1 a) and as *Apiopterina D'Orbignii* (f. 2 a). Montfort's odd figure of his *Lagenula* is here also referred to *Apiopterina*; and an obscure two-celled form is figured and described as *Lyrina Fischeri*.

The little annular Foraminifer from the "Sables IV^{res} de Grignon," described by A. Zborezewski, under the name of *Dactylina Fischeri*, in 1843 (Bulletin de la Soc. Imp. des Naturalistes de Moscou, xvi. p. 363), appears to be the same as *Dactylopora Annulus*. Zukowa in Podolia is also given as a locality, with a note of interrogation. The woodcut illustrating *D. Fischeri* is a rough diagram, but characteristic. A figure of what seems to be a Gyrogonite accompanies the woodcut above mentioned, and is named "Spirostegina;" but no description follows. The author also mentions some others of his species of Foraminifera under the names "Baphulina," "Cepiopterina," and "Pnylomorphina" (p. 364).

12. *Discorbites Pedemontanus*, *Defr.* 1819. Dict. xiii. p. 347. Indeterminable from the description given—"Orbicular, discoidal; spire entirely visible on one side only; chambers smaller and

more numerous than in *D. vesicularis*; fossil in Piedmont and Italy." Defrance mentions also having obtained three recent forms referable, he thinks, to *Discorbis*.

13. *Discorbites vesicularis*, Lamarck. Dict. xiii. p. 346, xxxii. p. 186; Atlas, Conch. pl. 14. f. 2; Blainv. Malac. pl. 6. f. 2. This is *Discorbina Turbo*, D'Orb., var. *vesicularis*; the same as *Rotalia Gervillii*, D'Orb. See Ann. Nat. Hist. ser. 3. v. p. 293, and Carpenter's 'Introduction,' p. 204.

14. *Discorbites vesicularis*. Atlas, Conch. pl. 13. f. 3; Blainv. Malac. pl. 5. f. 3. This figure probably represents a *Dendritina*, that is, a Nautiloid form of *Peneroplis planatus*, F. & M. sp.

15. *Fabularia Discolithus*, Defr. 1820. Dict. xvi. p. 103; Atlas, Zooph. pl. 48. f. 5; Blainv. Actinol. pl. 73. f. 5. "Alvéolite grain de millet." Fossil, from Grignon; and a flattened variety from Valognes. See Ann. Nat. Hist. ser. 3. v. p. 471. This *Fabularia* from Grignon was figured by Fortis in his Memoir on *Discolithi*, Mém. Nat. Hist. Italie, ii. pl. 2. f. Z, 1, 2, p. 109 (*Discolithus IX.*), and was named *Nummulites ovata* by De Roissy, Hist. Nat. Mollusques, 1804, v. p. 59; hence De Roissy's is the oldest specific name, and the species should stand as *Fabularia ovata*.

A full account of *Fabularia* is given by Dr. Carpenter in his 'Introduction,' p. 82 &c., pl. 6. f. 37, 38.

16. *Fabularia sphæroides*, Defr. 1820. Dict. xvi. p. 103. Fossil, from Chaumont. Given as a variety of the foregoing by Defrance.

17. *Frondicularia complanata*, Defr. 1824. Dict. xxxii. p. 178; Atlas, Conch. pl. 14. f. 4; Blainv. Malac. p. 371, pl. 6. f. 4. This is a fine large *Frondicularian* form of *Nodosarina*; fossil; probably from Italy.

It was also termed *Renulina complanata* by De Blainville (xxxii. p. 178). "Renulina" was also applied by him (*loc. cit.*) to the reniform variety of *Vertebralina* = *V. opercularia* (see Ann. Nat. Hist. ser. 3. v. p. 471), a very different form.

Frondicularia complanata is one of the most beautiful of the Foraminifera, and often of a relatively large size in the Italian Tertiary clays and sands, and in those of Malaga, San Domingo, and the Vienna Basin. The Chalk, Chalk-marl, and Gault have numerous individuals of varieties of this form, but they are of less size than those of the Tertiary deposits. Similar forms, but still smaller, are also common in several of the older clays of the Secondary epoch. In the recent state it is not common, but occurs of full size at Jamaica (the late Mr. L. Barrett's dredgings); and we have met with a long narrow *Frondicularia* (like *F. striatula*, Reuss) in Commander Dayman's dredgings, made in July 1859, off Lisbon, at 700 fathoms. Prof. William-

son has figured two specimens of *Fron dicularia* (regarded by him and Mr. Jeffreys as being recent, but most probably, we think, derived from the chalk cliffs) from the coast of Kent. In the sea-sand from Rimini worn specimens of *F. complanata* occur; some, however, are not more worn than many of the undoubted *Planularia Cymba* so common in, and characteristic of, the Rimini coast, while others are filled with ferruginous clay, and have been derived from Subapennine strata.

If we go back to the Liassic period, we find the *Nodosaria* (then forming a large proportion of the Rhizopodous fauna in certain clays) presenting innumerable gradations through somewhat flattened forms of *Nodosaria (Lingulina)* into true *Fron dicularia*, and through them to *Flabellina*, *Planularia*, and *Cristellaria*. It seems as if, in later times, these minor varieties have become more specialized as to locality; and nowadays, having gradually lost its potency as a genus, *Nodosarina* seldom, in any recent deposit, shows such comprehensive suites of varying forms as we find in the Lias, one subspecies now predominating over the others in the several Rhizopodal faunae.

As regards size, the largest individuals of all the Nodosarine group are found in the Tertiary deposits above referred to,—the recent Jamaica specimens (dredged by the late Mr. L. Barrett in from 100 to 250 fathoms) alone rivalling them.

The passage from *Fron dicularia* to *Flabellina* is very easy, as may be seen in many specimens from the Cretaceous and other deposits, in which the eccentricity of the primordial chamber is so slight, or, in other words, the tendency to coiling so weak, that the distinction between *Fron dicularia* and *Flabellina* can scarcely be said to exist in them, the shell in other respects presenting the general characters common to the two forms. *Flabellina* is to *Fron dicularia* as *Marginulina* and *Vaginulina* are to *Nodosaria* and *Lingulina*; that is, the shell is dimorphous, having had two successive plans of growth—the first spiral, like that of *Cristellaria*, the later rectilinear, like that of *Nodosaria*. The *Flabellina* of the Gault and Chalk-marl rival the largest *Fron dicularia*, and have been figured and described by D'Orbigny, Reuss, and others. *Palmula sagittaria*, Lea (Contributions to Geology, 1833, p. 219, pl. 6. f. 228), from the Cretaceous deposits of Timber Creek, New Jersey, is either a *Fron dicularia* or *Flabellina*, almost certainly the latter; for, although the early chambers are not shown, the later chevron-shaped chambers are not quite symmetrical. *Planularia cuneata*, S. G. Morton (Journ. Acad. Nat. Sc. Philadelphia, 1842, viii, pl. 11. f. 5), from the Middle Cretaceous Limestone of New Jersey, is also most probably a *Flabellina*, closely resembling *Fl. ovata*, Münster, sp. Reuss has pointed out that Von Münster's *Fron diculina* are

Flabellina: see N. Jahrb. 1849, p. 839, where *Flabellina ovata*, M. sp., *Fl. oblonga*, M. sp., *Fl. striata*, M. sp., and *Fl. cuneata*, M. sp., are figured in pl. 10. f. 23–26. In the ‘Galerie des Mollusques, ou Catalogue méthodique, descriptif et raisonné de mollusques et coquilles du Muséum de Douai,’ par V. L. V. Potiez et A. L. G. Michaud (2 vols. 8vo, Paris, 1858), pl. 9. f. 1–3 illustrate their *Fronicularia scutiformis*, which is a *Flabellina*; and f. 4–6 illustrate their *Textularia scapelliformis*, which is a *Fronicularia*. These are Belgian fossils from Autreppe, near Mons.

18. Hélicite. Dict. xx. p. 456. A name given by Gesner to *Nummulites*.

19. *Helicites perforatus*, *De M.* sp. Dict. xxxii. p. 179; Bl. Malac. p. 373. This is a small granulate *Nummulina*, the *Nautilus lenticularis*, var. ϵ , of Fichtel and Moll, Test. Micr. pl. 7. fig. *h*. See Ann. Nat. Hist. ser. 3. v. p. 108 & p. 111. (See also *Nummulites*, further on.)

20. *Helicites radiatus*, *De M.* Dict. xxxii. p. 179; Bl. Malac. p. 373. This is a small *Nummulina*, the *Nautilus lenticularis*, var. δ , of Fichtel and Moll, Test. Micr. pl. 7. fig. *g*. See Ann. Nat. Hist. ser. 3. v. p. 108 & p. 111. (See also *Nummulites*, further on.)

21–23. Larvaire. Dict. xxv. p. 287. (Larvaria.) DeFrance found, in the Calcaire grossier of the vicinity of Paris, and in the Tertiary sands at Bracheux and at Abbecourt, near Beauvais, some little cylindrical bodies, tubular, tapering at both ends, and composed of rings that readily fall apart, and grouped them, as three species of *Larvaria*, among the “Polypiers.” These we have already recognized as allied to *Dactylopora cylindracea* (Ann. Nat. Hist. ser. 3. v. p. 473, and Carpenter’s ‘Introduction,’ p. 132, pl. 10).

Larvaria reticulata, *Defr.* 1822. Dict. xxv. p. 287 (Bl. Actin. pl. 71. f. 3), has the axial hollow large.

L. limbata, *Defr.*, *ibid.*, has one end larger than the other, and a smaller central hollow; and its circular ranges of holes are less apparent.

L. Encrinula, *Defr.*, *ibid.*, is from the Tertiary beds of Hauteville (Manche), and has the central hollow very small; and the cylinder has its rings constricted at intervals.

Both *L. limbata* and *L. Encrinula* may well be varieties of *L. reticulata*. (See also *Dactylopora* and *Polytrypa*.)

24. *Lenticulina araneosa*, *De M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. A variety of *Cristellaria Calcar.* Ann. Nat. Hist. ser. 3. vi. p. 344.

25. *Lenticulina Calcar*, *Linn.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. This is the typical *Cristellaria Calcar.* See also Ann. Nat. Hist. ser. 2. xix. p. 290, & ser. 3. v. p. 111.

26. *Lenticulina costata*, *F. & M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. *C. Calcar*, var. *costata*. See Ann. Nat. Hist. ser. 3. v. p. 113.

27. *Lenticulina cucullata*, *De M.* sp. Dict. xxxii. p. 182. This is a variety of *Cristellaria Calcar*, Linn. sp. Ann. Nat. Hist. ser. 3. vi. p. 344.

28. *Lenticulina cultrata*, *De M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. *Cristellaria Calcar*, var. λ , Fichtel & Moll, Test. Micr. pl. 13. f. *e-g*. Ann. Nat. Hist. *l. c.* p. 343.

29. *Lenticulina diaphanea*, *De M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. The typical form of *Cristellaria Calcar*, Linn. sp. Ann. Nat. Hist. *l. c.* p. 339.

30. *Lenticulina incrassata*, *F. & M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 389. *Nonionina asterizans*, *F. & M.* sp., var. *incrassata*. Ann. Nat. Hist. ser. 3. v. p. 101.

31. *Lenticulina margaritacea*, *De Bl.* Dict. xxxii. p. 182; Bl. Malac. p. 390. *Cristellaria Calcar*, Linn. var. δ ; *F. & M.* Test. Micr. pl. 11. f. *i, k*. It is the "Pharame perlé" of De Montfort.

32. *Lenticulina querelans*, *De M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 389. This is Fichtel and Moll's *Cristellaria Calcar*, var. η . See Ann. Nat. Hist. ser. 3. v. p. 112, and vi. p. 343. It is the same variety as *C. rotulata*.

33. *Lenticulina rostrata*, *De M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. This is *Cristellaria Calcar*, var. ϵ , Fichtel & Moll, Test. Micr. pl. 12. f. *a-c*. Ann. Nat. Hist. ser. 3. v. p. 112.

34. *Lenticulina rotulata*, *Lam.* Dict. xxv. p. 453, xxxii. p. 181; Atlas, Zooph. pl. 15. fig. 7; Bl. Malac. pl. 7. f. 7. The common Cretaceous variety of *Cristellaria Calcar*.

35. *Lenticulina Trithemus*, *De M.* sp. Dict. xxxii. p. 182; Bl. Malac. p. 390. *Cristellaria Calcar*, var. ζ , Fichtel & Moll, Test. Micr. pl. 12. f. *d-f*. A modified individual of the var. *cultrata*.

36. *Lenticulites complanata*, *Defr.* 1822. Dict. xxv. p. 453. *Operculina complanata*. The small recent form is *O. ammonoides*; see Ann. Nat. Hist. ser. 3. viii. pp. 229, 230.

37. *Lenticulites* (et *Lenticulina*) *planulata*, *Lam.* Dict. xxv. p. 452; Atlas, Conch. pl. 14. f. 1; Bl. Malac. pl. 6. f. 1. *Nummulina planulata*. See Nummulites, further on. The figure represents a rather convex variety of *Nummulina planulata**, *Lam.* sp. See Ann. Nat. Hist. ser. 3. v. p. 295, and viii. p. 233.

* An interesting series of small individuals of this subspecies, varying in amount of convexity and other features, are figured and described by J. G. Bornemann, under the name of *Nummulina Germanica* (*Amphistegina nummularia*, Reuss), in the 'Zeitschr. deutsch. geol. Gesell.' 1860, xii. p. 158, pl. 6. f. 3-9.

38. *Lenticulites rotulata*, Lam. Dict. xxv. p. 453; Bl. Malac. p. 389. *Cristellaria rotulata*, from the Chalk of Meudon. This is the common form of *Cristellaria Calcar* as it occurs in the Chalk of Europe.

39. *Lenticulites variolaria*, Lam. Dict. xxv. p. 453. *Nummulina variolaria*, a small convex variety of *N. planulata*. See also Nummulites, further on.

40. *Licophris*. Dict. xxvi. p. 270. See *Lycophris*.

41. *Linthuris Cassis*, F. & M. sp. Dict. xxvi. p. 555, xxxii. p. 188; Atlas, Conch. pl. 19. f. 3; Bl. Malac. p. 384, pl. 10. f. 3. *Cristellaria Cassis*, F. & M. sp. [Type: *C. Calcar.*] See Ann. Nat. Hist. ser. 3. v. p. 115.

42. *Lituola* [et *Lituolites*] *nautiloides*, Lamarck. Dict. xxvii. p. 81, xxxii. p. 190; Atlas, Conch. pl. 20. f. 3; Bl. Malac. p. 381, pl. 11. f. 3. A common *Lituola*, recent and fossil. See Ann. Nat. Hist. ser. 3. v. p. 297.

43. *Lycophris Faujasii*, Defr. 1823. Dict. xxvii. p. 272 (*Orbitoides*?). From a deposit at Mirambeau, regarded by Defrance as equivalent to the Chalk of Maestricht. Prof. Reuss (in the Sitzungsbericht Akad. Wien, xlv. p. 313) has corrected our mistake in referring "*Lycophris Faujasii*" of the Maestricht Chalk to *Orbitolina* instead of to *Orbitoides* (Ann. Nat. Hist. vi. p. 36).

44. *Lycophris lentille* [*lenticularis*]. Atlas, Zooph. pl. 49. f. 3; Bl. Actinol. pl. 74. f. 3. This is an *Orbitoides*, and is not Montfort's *Lycophris lenticularis* (Fichtel & Moll's *Nautilus lenticularis*, var. β), which is a small granulate *Nummulina* (*N. Lucasana*, Defrance, MS., according to D'Archiac and Haime). See Nummulites, further on.

45. *Mélonie*. *Melonia* [erroneously for *Melonis*]. Dict. xxx. p. 17. *Melonis Etruscus*, De M., is the same as *Nonionina pompiloides*, F. & M. sp. *Polystomella Etrusca*, Bl. Malacol. p. 389.

46. *Mélonie*. Dict. xxx. p. 18. Defrance expresses the difficulty he finds in matching this with any of Lamarck's "*Mélonics*" (An. s. Vert. vii. p. 615), or with the one figured in Encycl. pl. 467. f. 1 *a, f, g & h*.

47. *Melonia sphaerica*, Lam. Dict. xxxii. p. 176; Atlas, Conch. pl. 15. f. 2; Bl. Malac. p. 369, pl. 7. f. 2.

48. *Melonia sphaeroidea*, Lam. Dict. xxxii. p. 176; Atlas, Conch. pl. 15. f. 3; Bl. Malac. p. 370, pl. 7. f. 3. This and the preceding are the varieties of *Alveolina Melo* originally figured by Fichtel and Moll. See Ann. Nat. Hist. ser. 3. v. p. 181, & viii. p. 163.

49. *Miliola birostris*, Lam. Dict. xxxi. p. 69. (*Quinqueloculina*.)

50. *Miliola Cor-anguinum*, *Lam.* Dict. xxxi. p. 68; Bl. Malac. p. 369, pl. 4. f. 3. A swollen *M. trigonula*.

51. *Miliola obscura*, *Defr.* 1824. Dict. xxxi. p. 69. A flat discoidal shell with a rough surface; probably a *Spiroloculina*. Fossil; Italy.

52. *Miliola opposita*, *Lam.* Dict. xxxi. p. 69. (Quinqueloculina.)

53. *Miliola planulata*, *Lam.* Dict. xxxi. p. 68. (Spiroloculina.)

54. *Miliola ringens*, *Lam.* Dict. xxxi. p. 68. (Biloculina.)

55. *Miliola Saxorum*, *Lam.* Dict. xxxi. p. 69, xxxii. p. 176; Atlas, Conch. pl. 15. f. 1; Bl. Malac. p. 369, pl. 7. f. 1. (Quinqueloculina.)

56. *Miliola trigonula*, *Lam.* Dict. xxxi. p. 68, xxxii. p. 176; Bl. Malac. p. 369. (Triloculina.)

For notes on the foregoing varieties of *Miliola Seminulum*, Linn. sp., see Ann. Nat. Hist. ser 3. v. p. 469 &c. See also Carpenter's 'Introduction,' pp. 74 *et seq.*

57. Miliolite; Miliolites. Dict. xxxi. p. 69. De Blainville expresses a doubt as to what Montfort's *Miliolites sabulosus* (which is an *Alveolina*) may be.

58. Miliolites Cor-serpentis, *De Bl.* Dict. xxxi. p. 69; Atlas, Conch. pl. 11. f. 3; Bl. Malacol. p. 369, pl. 4. f. 3. *Miliola Cor-anguinum*, *Lam.* A swollen *M. trigonula*.

59. *Nodosaria Bacillum* (Nodosaire Baguette), *Defr.* 1825. Dict. xxxv. p. 127, xxxvi. p. 487; Atlas, Conch. pl. 13. f. 4; Bl. Malac. pl. 5. f. 4. Fossil, from Italy. This is *Nodosaria Raphanistrum*, Linn. sp., a large variety of *Nodosaria Raphanus*, Linn. sp., which is the type of the very various Nodosarian and Cristellarian forms grouped in the great genus *Nodosarina*. Ann. Nat. Hist. ser. 3. iii. pp. 477, 478, and Carpenter's 'Introduction,' p. 159 &c.

60. *Nodosaria dentalina*, *Lam.* Dict. xxxv. pp. 125, 126. *N. Raphanus*, Linn. sp., var. *dentalina*; *Dentalina communis*, D'Orb. See Ann. Nat. Hist. ser. 3. vi. p. 39.

61. *Nodosaria fragilis*, *Defr.* 1825. Vélins du Mus. no. 48. f. 13; Dict. xxxv. p. 126. From the Maestricht Chalk of St. Peter's Hill. Occurring in fragments; long, pointed, slightly curved towards one end, with small gibbose chambers, some of them slightly sulcated. A delicate form of *N. obliqua*, Linn., and equivalent to Lamarck's *N. acicula*, which is a Dentaline variety of *N. Raphanus*.

62. *Nodosaria Radicula*, Linn. sp. Dict. xxxv. pp. 125, 126. *N. Raphanus*, var. *Radicula*. See Ann. Nat. Hist. ser. 3. iii. p. 479. DeFrance obtained specimens from the Maestricht Chalk.

63. *Nodosaria Siphunculus*, Linn. sp. Dict. xxxv. pp. 125, 126.

A *Serpula*. See Ann. Nat. Hist. ser. 3. iii. p. 480. See also Orthocera and Orthoceras, further on.

64. *Nubecularia lucifuga*, Defr. 1825. Dict. xxv. p. 210; Atlas, Zooph. pl. 44. f. 3; Bl. Actinol. pl. 66. f. 3, 3 a-3 d. From the Calcaire grossier and the Falunière of Hauteville, Dép. de la Manche.

Blainville and DeFrance here grouped the curious Miliolitic genus *Nubecularia* with the Zoophytes, giving some characteristic figures of it. Soldani has depicted numerous individuals in his great work 'Testaceographia,' placing them with the *Serpula*. We have found *Nubecularia*, associated with other Foraminifera, in very many recent sea-sands from shallowish water, and have been enabled to recognize their relations with the Miliolite group*. These are very protean shells: in deep water they are neither common nor large, but in the Algal belt they attain the size of hemp-seeds and even of split peas; and, growing attached to sea-weeds, shells, and other bodies, they become scale-like, or resemble lichens; or, winding about stalks and fronds, they form ring-like incrustations, shooting off into irregular processes and forming grotesque cervicorn figures (*N. lucifuga*). Similar forms occur in abundance in some of the French tertiaries. From the Clam-shells of the East Indian seas, and from the *Strombus gigas* of the West Indies, we get minute rectilinear individuals of *Nubecularia*, with a spiral commencement (*N. Tibia*). An allied variety, without a spiral beginning, is shown by D'Orbigny's *Webbina rugosa* (For. Canar. pl. 1. f. 16-18; and For. Vien. p. 74, pl. 21. f. 11, 12). In several clays of the Oolitic formations we have met with these elongate varieties attached to *Gryphæ*, &c.

All these Nubecularian forms have an opaque shell, frequently arenaceous, and are composed of minute, tent-like, plano-convex chambers, the base often being more or less imperfect; the aperture is produced, oval, and often lipped, and becomes enveloped in the base of the new chamber, as in the true *Miliolæ*.

The foregoing varieties of *Nubecularia* (*N. lucifuga*, *N. Tibia*, and *N. rugosa*), however dissimilar among themselves, are all referable to the same specific type, which is sufficiently well represented by *N. lucifuga*, DeFr., above referred to.

65. *Nummulites complanata*, Lam. Dict. xxv. p. 224. *Camerina nummularia*, Bruguière. DeFrance notices one specimen having a width of 3 inches and a thickness of 3 lines; giving the following localities:—Egypt, Soissons, Languedoc, Transylvania, Mont Aubrey en Suisse, Vicentin, et Véronnais; and he remarks that "It is doubtful whether one and the same

* See Quart. Journ. Geol. Soc. xvi. p. 455, pl. 20. f. 48-56; and Carpenter's 'Introduction,' p. 69, pl. 5. f. 1-15.

species be spread over so great an extent of country; but no difference can be established except on the size and thickness; and so it is difficult to fix it in this respect." See also Ann. Nat. Hist. ser. 3. viii. p. 234.

66. *Nummulites concava*, Defr. 1825. Dict. xxxv. p. 325. "White, like ivory." Brought from the Crimea by Dr. E. D. Clarke ("par le célèbre voyageur Klark"). "It has a little round central cavity in the interior, is complanate;" "probably those from Cairo are the same." Hence probably it is a variety of *N. complanata*. Ann. Nat. Hist. l. c. p. 234.

67. *Nummulites globularia*, Lam. Dict. xxxv. p. 224. A globular variety of *N. lævigata*, as DeFrance judiciously suggested.

68. *Nummulites lævigata*, Bruguière. Dict. xxxii. p. 179, xxxv. p. 224; Bl. Malac. p. 372. *Nummulina lævigata*: a subtype, characterized by inoculation of the septa of the alar lobes. See Ann. Nat. Hist. ser. 3. v. p. 290, & viii. p. 232.

DeFrance remarks,—“Il est extrêmement probable que c'est la même espèce, modifiée par les localités, que l'on trouve en Suisse, dans le Véronnais, en Dalmatie, sur le mont Pilate près de Lucerne, à Stubbington dans le Hampshire, et dans d'autres endroits.”

69. *Nummulites*(?) *Lenticula*, Defr. 1825. Dict. xxxv. p. 226. Sienna, Pisa, Vicentin, Oise, La Somme, Belgium, &c. This is, according to D'Archiac and Haime, an *Amphistegina* (Monogr. p. 161); and, judging from specimens brought from Pisa, we are of the same opinion.

70. *Nummulites lenticularis*, De Bl. Dict.; Atlas, Conch. pl. 11. f. 2; Bl. Malac. pl. 4. f. 2. This is in the index to the Atlas, not in the text. It is *Nummulina lævigata*, Bruguière.

71. *Nummulites Lenticulus*, De Bl. 1824. Dict. xxxii. p. 179; Malac. p. 373. *Lycophris lenticularis*, De M.; Fichtel & Moll's *Nautilus lenticularis*, var. β . A small granulose *Nummulina* (*N. Lucasana*, Defr. var. α , D'Archiac and Haime). De Blainville says, "Of a species of this section (*Lycophris*, De M.) DeFrance makes a genus of 'Polypiers.'" Apparently they mistook a rough *Orbitoides* for the little granular Nummulite figured and described by Fichtel and Moll, and subsequently by De Montfort. See Ann. Nat. Hist. ser. 3. v. pp. 108, 110, vi. p. 342, and viii. p. 233.

72. *Nummulites Moneta*, Defr. 1825. Dict. xxxv. p. 226. One inch wide. Ronca; Dalmatia; lowest beds of the Isles of Veglia, Pago, and Arbe; Croatia; Alicante. According to D'Archiac and Haime, this is the *N. Spira* of Roissy, "Discolithe no. 6" of Fortis. An Assiline form of *Nummulina*.

73. *Nummulites Ramondi*, Defr. 1825. Dict. xxxv. p. 226. Mont Perdu; Montagne de Lex-d'Argentin; Valley of Auzeindre

audessus de Bex; Placentin?; Bayonne? A small *Nummulina* adopted by D'Archiac as a species (Monogr. p. 128, pl. 7. f. 13-17).

74. *Nummulites Rotula*, DeFr. 1825. Dict. xxxv. p. 224. Morlaie. A variety of *N. levigata*, in company with which it occurs. See also D'Archiac and Haime's Monogr. p. 105.

75. *Nummulites scabra*, Lam. Dict. xxxv. p. 224. The granulose variety of *N. levigata*. Ann. Nat. Hist. ser. 3. v. p. 296, & viii. p. 235.

76. *Nummulites spissa*, DeFr. 1825. Dict. xxxv. p. 225. Locality unknown. According to D'Archiac and Haime (Monogr. p. 115), this is a young *Nummulina perforata*, Montf. sp.

See also *Helicites* and *Lenticulites*, for other *Nummulites*.

77. There is another *Nummulina* named specifically by DeFrance, in MS., namely *N. Lucasana*, adopted by D'Archiac; see D'Archiac's 'Progrès de la Géologie,' 1850, iii. p. 238, and D'Archiac and Haime's 'Monograph,' p. 124. It is included with a granulate *N. Spira* under the name *N. verrucosa* by De Roissy. Ann. Nat. Hist. ser. 3. viii. p. 238.

78. Another *Nummulite*, named by DeFrance *N. nummiformis* in Alex. Brongniart's 'Vicentin' (1823), p. 51, was not reproduced in the Dict. Sc. Nat. It is related to *N. complanata*, and is named *N. Brongniarti* by D'Archiac and Haime, 'Monograph,' p. 110, reasons for not using the name given by DeFrance being advanced at p. 111.

79. *Orbiculina adunca*, F. & M. sp. Dict. xxxii. p. 180; Bl. Malac. p. 375.

80. *Orbiculina angulata*, F. & M. sp. Dict. xxxii. p. 180; Bl. Malac. p. 374.

81. *Orbiculina numismalis*, Lam. (*Nautilus Orbiculus*, F. & M.) Dict. xxxii. p. 180, xxxvi. p. 291; Atlas, Conch. pl. 15. f. 4; Bl. Malac. p. 373, pl. 7. f. 4 (*O. nummata*). This and the two preceding are *Orbiculina adunca*, F. & M. sp. and varieties. See Ann. Nat. Hist. ser. 3. v. pp. 180 &c., and Carpenter's 'Introduction,' p. 93 &c.

82. *Orbiculites lenticulata*, Lam. sp. Atlas, Zooph. pl. 51. f. 5; Blainv. Actinol. pl. 76. f. 5. See *Orbitolites*.

83. *Orbitolites complanata*, Lam. Dict. xxxvi. p. 294; Atlas, Zooph. pl. 47. f. 2 (Bl. Actinol. pl. 72. f. 2). Paris; Hauteville. DeFrance notices that this species has a very close relationship with that found living in the seas of New Holland. Ann. Nat. Hist. ser. 3. v. p. 291.

84. *Orbitolites concava*, Lam. Dict. xxxvi. p. 295. This is *Patellina concava*, Lam. sp. In 1860 we referred this and other forms to D'Orbigny's genus *Orbitolina* (Ann. Nat. Hist. ser. 3. vi. p. 29 &c.); but, in consequence of later researches by Dr.

Carpenter, our list of the *Orbitolinæ* at p. 38, *ibid.*, is considerably modified: thus—

Orbitolina simplex, *O. semiannularis*, *O. corrugata*, and *O. annularis* now stand under *Patellina corrugata*; *Orbitolina concava* and *O. lenticularis* under *Patellina concava*; *Patellina Cooki* (fossil at Scinde) is an added species (Carter); *Orbitolina vesicularis*, *O. congesta*, *O. lævis*, *O. sphaerulata*, and *O. sphaerulolineata* are grouped under *Tinoporus vesicularis* ("Tinoporus" being preferred by Dr. Carpenter to "Orbitolina" as a generic term).

85. *Orbitolites lenticulata*, *Lam.* Dict. xxxvi. p. 295; Atlas, Zooph. pl. 51. f. 5. *Madreporites lenticularis*, Blumenbach. This is *Patellina concava*, *Lam.* sp., var. *lenticularis*. See Ann. Nat. Hist. ser. 3. vi. p. 29 &c., and especially Carpenter's 'Introduction,' p. 231.

86. *Orbitolites macropora*, *Lam.* Dict. xxxvi. p. 295. A large-celled variety of *O. complanata*, *Lam.* See Ann. Nat. Hist. ser. 3. vi. p. 38.

87. *Orbitolites Pileolus*, *Lam.* Dict. xxxvi. p. 295. A concavo-convex variety of *Patellina concava*, *Lam.* sp. Ann. Nat. Hist. ser. 3. vi. p. 39.

88. *Orbulites planulatus*, *Bl.* Dict. xxxvi. p. 295; Atlas, Zooph. pl. 47. f. 2; *Bl. Actinol.* pl. 72. f. 2. *Orbitolites complanata*, *Lam.* See *Orbitolites*.

89. *Oreas auricularis*, *Bl.* Dict. xxxii. p. 188, xxxvi. p. 155; Atlas, Conch. pl. 19. f. 4; *Bl. Malac.* p. 383, pl. 10. f. 4. This is the subglobose form of *Cristellaria Calcar* known as *C. acutauricularis*, *F. & M.* sp. See Ann. Nat. Hist. ser. 3. v. p. 114.

90. *Orthocera Acicula*, *Lam.* Dict. xxxvi. p. 487. *Nodosaria Raphanus*, *Linn.* sp., var. *Acicula* (probably the same as *N. obliqua*, *Linn.* sp.). See Ann. Nat. Hist. ser. 3. vi. p. 39.

91. *Orthocera Fascia*, *Linn.* sp. Dict. xxxvi. p. 486. *Nodosaria.* Ann. Nat. Hist. ser. 3. iii. p. 478.

92. *Orthocera Legumen*, *Linn.* sp. Dict. xxxvi. p. 487. *Nodosaria (Vaginulina) Legumen*, *Linn.* sp. See Ann. Nat. Hist. l. c. p. 479.

93. *Orthocera obliqua*, *Linn.* sp. Dict. xxxvi. p. 487. *Nodosaria.* *Ibid.* p. 477.

94. *Orthocera Raphanistrum*, *Linn.* sp. Dict. xxxvi. p. 486. *Nodosaria.* *Ibid.* p. 478.

95. *Orthocera Raphanus*, *Linn.* sp. Dict. xxxvi. p. 486. *Nodosaria.* *Ibid.* p. 477. The typical *N. Raphanus* is termed *N. Rapa* by D'Orbigny (*Ann. Sc. Nat.* vii. p. 253, no. 27), probably from the intermediation and retranslation of the French word "rave." For its Marginuline form D'Orbigny used the term *N. Raphanus*: this often occurs in the Adriatic and else-

where (D'Orb. Ann. Sc. Nat. vii. p. 258; Modèles, No. 6), and is well figured by Soldani in his Testac. i. pt. 2. pl. 94, and by Ehrenberg in the Abhandl. k. Akad. Berlin, 1838 (1839), pl. 1. f. II. A, B, a, b, c. See also 'Nodosaria,' above.

96. Orthoceras Radicula, Linn. Dict. xxxii. p. 192; Bl. Malac. p. 179. The simple form of *Nodosarina* known as *Nodosaria Radicula*, Linn. sp. Ann. Nat. Hist. ser. 3. iii. p. 479.

97. Orthoceras Raphanus, Linn. sp. Dict. xxxii. p. 192; Bl. Malac. p. 379. This is the typical *Nodosaria Raphanus*, Linn. sp. *Ibid.* p. 478.

98. Orthoceras Scorpiurus, De M. sp. Dict. xxxii. p. 192. This is the *Lituola Scorpiurus*, De Montf. [Type: *Lituola nautiloidea*, Lam.] See Ann. Nat. Hist. ser. 3. vi. p. 346.

99. Oryzaria Boscii, DeFr. 1820. Dict. xvi. p. 106; Atlas, Zooph. pl. 48. f. 4; Blainv. Actinol. pl. 73. f. 4. "Alvéolite grain de fêtuque." *Alveolina Melo*, F. & M. sp., var. *sabulosa* (*Miliolites sabulosus*, Montfort). See Ann. Nat. Hist. ser. 3. viii. p. 162.

100. Ovulites elongata, Lam. Dict. xxxvii. p. 134; Atlas, Zooph. pl. 48. f. 3; Bl. Actinol. pl. 73. f. 3. This is the var. *elongata* of *O. Margaritula*, Lam. See Ann. Nat. Hist. ser. 3. v. p. 292; and Carpenter's 'Introduction,' p. 179, pl. 12. f. 9, 10.

101. Ovulites globulosa, DeFr. 1825. Dict. xxxvii. p. 134. (Vélins du Mus. no. 48. f. 9.) This is described as being smaller than a mustard-seed, almost spherical, the apertures at each end scarcely discernible. Fossil at Grignon and Villiers (Seine et Oise), and Courtagon near Rheims. DeFrance also speaks of a similar little globular fossil, of the same size, but solid and more spherical, found in the same bed at Villiers, and also at Rimini.

The first of these is most probably a globular *Ovulites*, such as occur in the Grignon deposits; and the latter may be spherical atoms of carbonate of lime, not unusual in some marine deposits.

102. Ovulites Margaritula, Lam. Dict. xxxvii. p. 134; Atlas, Zooph. pl. 48. f. 2, & pl. 50. f. 6; Bl. Actinol. pl. 73. f. 2, pl. 75. f. 6. Ann. Nat. Hist. l. c.

103. Peneroplis Auris, DeFr. sp. Dict. xxxii. p. 178; Atlas, Conch. pl. 14. f. 5; Blainv. Malac. pl. 6. f. 5. This, wrongly referred by De Blainville to *Peneroplis*, is the *Planularia Auris* of DeFrance, which see.

104. Peneroplis dilatata, Lam. sp. Dict. xxxii. p. 178; Bl. Malac. p. 372. This is a variety of *Nautilus planatus*, F. & M.; misnamed by Lamarck "Cristellaria," and rightly referred to *Peneroplis* by De Blainville.

105. Placentula asterizans, F. & M. sp. Dict. xxxii. p. 180,

xli. p. 193. This is the *Polystomella (Nonionina) asterizans*, F. & M. sp. See Ann. Nat. Hist. ser. 3. v. p. 101.

106. *Placentula pulvinata*, Lam. Dict. xxxii. p. 180, xli. p. 193; Atlas, Conch. pl. 15. f. 5; Bl. Malac. pl. 7. f. 5. This is the *Pulvinulina repanda*, F. & M. sp.

107. *Planularia Auris*, DeFr. 1824. Dict. xxxii. p. 178, xli. p. 244; Atlas, Conch. pl. 14. f. 5; Bl. Malac. p. 371, pl. 6. f. 5. This is a very thin outspread variety of *Cristellaria Cymba*, D'Orb. (*Planularia Cymba*, Ann. des Sc. Nat. vii. p. 260, no. 4, pl. 10. f. 9; Modèles, no. 27; Soldani, Testac. i. pt. 1, pl. 58. f. c, c.) It is the same as Soldani's *Orthoceras Auris* (Testac. i. pt. 2, pl. 104. f. A).

DeFrance's term *Planularia* is applicable to a group of elegant forms connecting the Nautiloid *Cristellariæ* with their Marginuline varieties and with *Vaginulinæ*, and thus constituting a noticeable member of the great genus *Nodosarina*.

108. *Polystomella ambigua*, F. & M. sp. Dict. xxxii. p. 183; Bl. Malac. p. 388. A common variety of *P. crispa*. See Ann. Nat. Hist. ser. 3. v. pp. 103, 104.

109. *Polystomella Etrusca*, De M. sp. Dict. xxxii. p. 183; Bl. Malac. p. 389. This is *P. (Nonionina) pompilioides*, F. & M. sp. See Ann. Nat. Hist. ser. 3. v. p. 102.

110. *Polystomella macella*, F. & M. sp. Dict. xxxii. p. 183; Bl. Malac. p. 388. This is Fichtel and Moll's var. β of *P. macella*, a flat form of *P. crispa*. *Ibid.* p. 104.

111. *Polystomella margaritacea*, De M. sp. Dict. xxxii. p. 183; Bl. Malac. p. 389. This is *P. (Nonionina) Faba*, F. & M. sp. See Ann. Nat. Hist. ser. 3. v. p. 102, vi. p. 339.

112. *Polystomella planulata*, Lam. Dict. xxxii. p. 183; Atlas, Conch. pl. 15. f. 8; Bl. Malac. p. 388, pl. 7. f. 8. A flat *P. crispa*. The same as *P. macella*, F. & M. sp.

113. *Polystomella Vortex*, F. & M. sp. Dict. xxxii. p. 183; Bl. Malac. p. 389. This is *Cristellaria Vortex*, F. & M. sp. See Ann. Nat. Hist. ser. 3. v. p. 113.

114. *Polytrema miniacea*, Esper, sp. Polytrème rouge, Bl. Atlas, Zooph. pl. 44. f. 4, 4 a; Actinol. p. 410, pl. 69. f. 4, 4 a. This was first recognized as *Millepora miniacea*, Esper, Zooph. i. pl. 17; Gmel. Syst. Nat. 3784; afterwards as *M. rubra*, Lamarck, Hist. An. s. Vert. ii. p. 202, no. 8; *Polytrema coralina*, Risso, Eur. Mérid. v. p. 340, no. 91; *Polytrema miniacea*, Blainville, Actinol. p. 410, pl. 69. f. 4, 4 a. It is a fixed, reddish, often branching Rhizopod, related to *Orbitolina (Tinoporus)*, *Patellina*, and other *Rotalinæ*. See Carpenter's 'Introduction,' p. 235, pl. 13. f. 18-20.

115. *Polytrypa elongata vel Polytrypes elongatus*, DeFr. 1826. Dict. xlii. p. 453; Atlas, Zooph. pl. 48. f. 1 (Bl. Actinol. pl. 73. f. 1).

Polytrypa was referred by Defrance to the "Polypiers à réseau;" and his specimens were obtained from the Eocene Tertiaries of France. He acutely observed that the individuals "vary according to the localities." From Grignon he had it 5 lines long and about 1 line thick; from Orglandes (Manche) half as thick again, and shorter; from Villiers, near Grignon, scarcely a line long; and from Mortefontaine (Oise), from the Grès marin supérieur, 4 lines long, not half a line in diameter. He justly remarks that "these are probably varieties of one species"—a conclusion at which we have arrived by a careful examination of numerous specimens, as explained in the Ann. Nat. Hist. ser. 3. v. pp. 473 &c., where *Polytrypa*, *Larvaria*, and *Dactylopora* are shown to be one. See also Carpenter's 'Introduction,' p. 127 &c.

116. *Pyrgo lævis*, *Defr.* 1824. Dict. xxxii. p. 273; Atlas, Zool. pl. 88. f. 2; Bl. Malac. p. 482, pl. 62 bis, f. 2. Referred by De Blainville to the Pteropods. This is the common *Miliola* (*Biloculina*) *ringens*, Lam., var. *bulloides*, D'Orb., and was regarded by Defrance as belonging to the same group (the *Sphærulacea* of De Blainville).

117. *Renulina complanata*, *Defr.* sp. Dict. xxxii. p. 178. This is Blainville's name for *Frondicularia complanata*, Defrance (which see).

118. *Renulina opercularia* [*opercularis*], *Lam.* Dict. xxxii. p. 178; Bl. Malac. p. 371. See Ann. Nat. Hist. ser. 3. v. p. 476 for an account of this curious and rare variety of *Vertebralina*; also Carpenter's 'Introduction,' p. 74, pl. 5. f. 18. Blainville's term "Renulina" is not required.

119. *Rotalites Cidarollus*, *Bl.* (*Cidarollus plicatus*, De M.). Dict. xxxii. p. 187. A common variety of *Pulvinulina repanda*. It is *R. pulchella*, D'Orb., Modèles, no. 71. Ann. Nat. Hist. ser. 3. vi. p. 340.

120. *Rotalites Cortalus*, *Bl.* (*Cortalus Pagodus*, De M.). Dict. xxxii. p. 187. Quite indeterminable. See Ann. Nat. Hist. ser. 3. vi. p. 340.

121. *Rotalites lenticulina*, *Lam.* Dict. xlvi. p. 302. Probably a variety of *Discorbina Turbo*. See Ann. Nat. Hist. ser. 3. v. p. 294.

122. *Rotalites depressa*, *Lam.* Dict. xlvi. p. 303. Probably one of the Truncatuline varieties of *Planorbulina farcta*.

123. *Rotalites discorbula*, *Lam.* Dict. xlvi. p. 303. This is *Rotalia Beccarii*, Linn. sp.

124. *Rotalites Storillus*, *Bl.* (*Storillus radiatus*, De M.). Dict. xxxii. p. 187. An indeterminate Rotaline. See Ann. Nat. Hist. ser. 3. vi. p. 341.

125. *Rotalites* (et *Rotulites*) *trochidiformis*, *Lam.* Dict. xxxii.

p. 187, xlv. p. 303; Atlas, Conch. pl. 14. f. 3, & pl. 19. f. 1; Bl. Malac. p. 391, pl. 6. f. 3, & pl. 10. f. 1. DeFrance remarks that both dextral and sinistral shells occur.

This is a well-developed variety of *Discorbina Turbo*, D'Orb. See Ann. Nat. Hist. ser. 3. v. p. 294; and Carpenter's 'Introduction,' p. 204.

126. *Saracenaria italica*, Defr. 1824. Dict. xxxii. p. 177, xlvii. p. 344; Atlas, Conch. pl. 13. f. 6; Bl. Malac. p. 370, pl. 5. f. 6. Fossil; from Italy: a trihedral *Cristellaria*. DeFrance likens it to "un petit grain de sarrasin:" $\frac{1}{2}$ line to $1\frac{1}{2}$ line in diameter.

This is found, both recent and fossil, where *Cristellariae* are abundant. D'Orbigny had this from Rimini in the Adriatic, and recognized it as a *Cristellarian* form, making it a subgenus of *Cristellaria*, and illustrating it by his Models, nos. 19 & 85 (Ann. Sc. Nat. vii. p. 293).

127. *Siderolina calcytrapoides* et *Siderolites calcitrapoides*, Lam. sp. Dict. xxxii. p. 180, xlix. p. 98; Atlas, Conch. pl. 13. f. 7; Bl. Malac. pl. 5. f. 7. From Maestricht. *Calcarina Spengleri*, Gmel. sp. See Ann. Nat. Hist. ser. 3. iii. p. 480, & v. p. 291; and Carpenter's 'Introduction,' pp. 216-223.

128. *Siderolites Spengleri*, Gmel. sp. Dict. xxxii. p. 179; Bl. Malac. p. 373. This is *Calcarina Spengleri*, Gmel. sp.

129. *Spirolina* (et *Spirolinites*) *cylindracea*, Lam.* Dict. vol. 1. p. 298; Atlas, Conch. pl. 13. f. 1; Bl. Malac. pl. 5. fig. 1; and

130. *Spirolina* (et *Spirolinites*) *depressa*, Lam. Dict. vol. 1. p. 298; Atlas, Conch. pl. 13. f. 2; Bl. Malac. pl. 5. f. 2. DeFrance alludes also to a recent species, apparently identical with *Sp. cylindracea*, and living in the Mediterranean. He remarks that, in the 'Tabl. Méth. Céph.' (Ann. Sc. Nat. vii. p. 287), D'Orbigny notices also *Spirolina striata*, *Sp. laevigata*, and *Sp. Pedum*, found fossil near Paris, and groups these with *Lituola* (*Lituolites*) *nautiloides*; but he thinks the difference in the aperture does not depend on age, as D'Orbigny thinks. In this indication of D'Orbigny's mistake, DeFrance is correct; the *Lituolæ* are very distinct from the so-called *Spirolinæ*, which are narrow forms of *Peneroplis planatus*, F. & M. sp. See Ann. Nat. Hist. ser. 3. v. pp. 297 & 466 &c.

131. *Spiroloculina*, D'Orb. Dict. vol. 1. p. 299. Under this head DeFrance quotes nine fossil species from D'Orbigny's Tabl. Méth. Céph. (Ann. Sc. Nat. vii. p. 298).

132. *Spirula cylindracea*, Lam. sp. Dict. xxxii. p. 190; Bl.

* Lamarek figured two distinct forms under this name, namely *Peneroplis cylindracea*, and a Clavuline variety of *Valvulina triangularis* (*Valvulina Clavulus*). See Ann. Nat. Hist. ser. 3. v. p. 467 &c.

Malac. p. 382, pl. 5. f. 1. This is De Blainville's name for Lamarck's *Spirolina cylindracea* (which see).

133. *Textularia Sagittula*, DeFr. 1824. Dict. xxxii. p. 177, liii. p. 344; Atlas, Conch. pl. 13. f. 5; Bl. Malac. p. 370, pl. 5. f. 5. "This is Soldani's *Polymorphum Sagittula*, Testac. vol. i. part 2. p. 120, pl. 133, vas 260. f. o. It occurs fossil near Sienna and Castel d'Arquato, and lives in the Mediterranean. We have only this one species; but, in his Tabl. Méth. Céphal., D'Orbigny enumerates twenty-six other species, of which most are fossil."

This is a common *Textularia*—indeed, the most common variety. It is not the type of the genus, however, which is best typified by *T. agglutinans*, D'Orb., a more inflated form, and generally of a larger size. *T. gibbosa*, D'Orb., attains still larger proportions, being a more exaggerated variety.

The figure given by Blainville and DeFrance (Atlas, Zooph. pl. 13. fig. 5) differs somewhat from that in Soldani's book. The specimen was of smaller size, flatter, the earlier chambers smaller, and the newest chambers more contracted—the shell well representing an unbarbed arrow-head in miniature. Soldani's figure seems to indicate the presence of a third series of chambers on one of the sides; but we think that this feature was probably only a low ridge arising from an irregular form of the chambers on the unattached surface of the shell, and not really due to an intercalated series of chambers. The specimen figured by Soldani was of rather large size; and we have met with several in the Mediterranean of equal magnitude: they take on the more regularly sagittate form in their smaller condition; when largely developed, they often approximate to *T. agglutinans*, D'Orb.

T. Sagittula is very common, ranging from shallow water to a depth of 150 fathoms. The subgroup typified by DeFrance's and Soldani's figures, above referred to, comprises a large and variable series of forms, recent and fossil, which have been abundantly supplied with names. *T. Sagittula* and *T. agglutinans* are the commonest of all the *Textulariæ*; they are world-wide, and go far back in time. Of the *Textulariæ* on our own coasts they are the most abundant. In Prof. Williamson's Monograph, figs. 158 & 159 afford, we think, a good example of the small *T. Sagittula* (although that author refers it to *T. cuneiformis*, D'Orb., which appears to us to be a distinct variety). *T. Sagittula* and its larger allies become sandy in their adult state; smaller varieties of *T. agglutinans* (the type), such as *T. pygmæa*, D'Orb. (*T. aciculata*, D'Orb.), remain hyaline and poriferous. See also Ann. Nat. Hist. ser. 3. xi. p. 91 &c., and Carpenter's 'Introduction,' p. 189 &c.

D'Orbigny (Ann. Sc. Nat. vii. p. 264) refers to *Textularia Capreolus*, DeFrance; but it does not appear in the Dict. Sc. Nat.

134. *Vorticialis craticulata*, F. & M. sp. Dict. xxxii. p. 181; Atlas, Conch. pl. 15. f. 6; Bl. Malac. p. 375, pl. 7. f. 6. A large variety of *Polystomella crispa*, Linn. sp. See Ann. Nat. Hist. ser. 3. v. p. 105, and Carpenter's 'Introduction,' p. 279, pl. 16.

135. *Vorticialis crispa*, Linn. sp. Dict. xxxii. p. 181; Bl. Malac. p. 375. This is the *Polystomella crispa*, Linn. sp. Lamarck's generic name "*Vorticialis*" is not required.

136. *Vorticialis marginata*, Lam. sp. Dict. xxxii. p. 181; Bl. Malac. p. 375. This is *Polystomella crispa*, Linn. sp., var. *strigilata*, subvar. β , F. & M. Ann. Nat. Hist. ser. 3. v. p. 105.

137. *Vorticialis strigilata*, F. & M. sp. Dict. xxxii. p. 181; Bl. Malac. p. 375. *Polystomella crispa*, var. *strigilata*. This, like the foregoing, is a somewhat flattened variety.

XXII.—*A List of the Formosan Reptiles; with Notes on a few of the Species, and some Remarks on a Fish (Orthagoriscus, sp.).*

By R. SWINHOE, F.Z.S., F.G.S. &c., H.M. Vice-Consul at Formosa.

I PROCURED at Formosa the following fifteen species of Reptilia, which have since been deposited in the British Museum. Dr. Günther has determined their species, and is describing the novelties in the British Museum Catalogue now publishing. To that gentleman's kindness I am indebted for the names.

CISTUDINA (Tortoises).

1. *Emys sinensis*, Gray.

Abundant about the pools and inland waters of South-west Formosa, near Taiwanfoo. They were brought to me by the natives there in large numbers. I forwarded five live specimens to England as a present to the Gardens of the Zoological Society. Three of them arrived safe, and are now exhibited in the menagerie at the Regent's Park.

2. *Trionyx sinensis*, Coregm.

Very abundant in the rivers near Amoy, but rather rare in South-west Formosa, where I procured but a very few examples. It has a long projectile neck, and very sharp teeth, with which it can inflict a severe bite. When once it seizes an object,